CLAIM + DETAILED DESCRIPTION

[Claim(s)]

[Claim 1] The biaxial drawing lamination film which has Z layer which consists of X layer which consists of an ethylene-vinyl acetate copolymer **** ghost (EVOH), Y layer which consists of fatty series polyamide, the KISHIRIREN system polyamide 20 - 80 mass % and the fatty series polyamide 20 - 80 mass % and which consists of at least three layers.

[Claim 2] The biaxial drawing lamination film according to claim 1 with which X layer does 5-15 mass % content of talc.

[Claim 3] The biaxial drawing lamination film according to claim 1 or 2 whose layer composition is Y/Z/X/Z/Y.

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention has the pinhole-proof nature which was excellent in the polyamide film, and the outstanding gas barrier property which an EVOH film has about a polyamide system lamination film, has the further excellent smell retaining property, and relates to the suitable polyamide system lamination film for packaging materials, such as food and medical supplies.

[0002]

[Description of the Prior Art] The lamination film which consists of a polyamide film and an EVOH film has the pinhole-proof nature which was excellent in the polyamide film, transparency, dimensional stability, and the gas barrier property that was excellent in the EVOH film, and is used as packaging materials, such as food and medical supplies. However, this lamination film has the outstanding oxygen interception nature. On the other hand, when the stinking strong thing was packed as a content, not the level that can never be satisfied

about a smell retaining property but a dressing, soy sauce or bean paste, etc. has the problem that a smell will begin to leak in several small days, and received restriction in the use in many cases. Moreover, since intensity is weak and the pinhole-proof nature to the crookedness under low temperature, a shock, etc. is inadequate compared with a polyamide monolayer film, this lamination film is. a content leaks owing to and fall and the pinhole produced from the exterior as a result of thrust **** by a content carry out appearance -- etc. -- it was not what a trouble may generate and can be functionally satisfied enough as a packaging material.

[0003]

[Problem(s) to be Solved by the Invention] There is a technical problem of this invention in offering the polyamide system lamination film which has a smell retaining property, gas barrier property, and pinhole-proof nature.

[0004]

[Means for Solving the Problem] In the lamination film which consists of an EVOH layer and a fatty series polyamide layer as a result of inquiring wholeheartedly, in order that this invention persons may solve the above-mentioned technical problem By laminating the layer which consists of KISHIRIREN system polyamide and fatty series polyamide, it found out that the lamination film which has a smell retaining property, the outstanding gas barrier property, and outstanding pinhole-proof nature could be offered, and this invention was completed. That is, the summary of this invention is as follows.

[0005] (1) The biaxial drawing lamination film which has Z layer which consists of X layer which consists of an ethylene-vinyl acetate copolymer **** ghost (EVOH), Y layer which consists of fatty series polyamide, the KISHIRIREN system polyamide 20 - 80 mass % and the fatty series polyamide 20 - 80 mass % and which consists of at least three layers.

(2) The biaxial drawing lamination film which X layer indicated to (1) which does 5-15 mass % content of talc.

(3) The biaxial drawing lamination film which layer composition indicated to (1) which is Y/Z/X/Z/Y, or (2).

[0006]

[Embodiment of the Invention] Next, this invention is explained in detail. X layer consists of an ethylene-vinyl acetate copolymer **** ghost (EVOH) in this invention. Gas barrier property and intensity are excellent in the being [the content of an ethylene ingredient / the saponification degrees of 25-35mol % and acetic acid vinyl / more than 96 mol % and also more than 99 mol %] thing, and EVOH's is desirable. If it is easy to generate gel less than [25 mol %] and the content of an ethylene ingredient exceeds 35mol %, the characteristics acquired, such as intensity, gas barrier property, etc. of a film, fall and are not desirable.

[0007] In this invention, it is desirable to add talc to EVOH of X layer. A smell retaining property, gas barrier property, and a pinhole-proof are improved by addition of talc. As for the

average particle diameter of talc, less than 1.3 micrometers is desirable. The transparency of a film is spoiled and it may become an exterior and a problem as particle diameter becomes large. the amount of addition of talc to EVOH -- five to 15 mass % -- it is seven to 13 mass % preferably. It brings about the transparency of a film, or the increase in the fish eye by secondary condensation of talc and is not desirable, when there are few improvement effects of gas barrier property or a smell retaining property and the case of under 5 mass % exceeds 15 mass %.

[0008] moreover, the purpose which raises pinhole-proof nature further to EVOH of X layer -- an ethylene acetic acid vinyl system copolymer and me -- you may add a fin unsaturated-carboxylic-acid copolymer or its metal salt.

[0009] [the fatty series polyamide which is the composition ingredient of Y layer and Z layer] in this invention It is thermoplastics which has amide combination (-CONH-) in the molecule and in which fusion fabrication is possible. Polycapramide (nylon 6), polyhexamethylene adipamide (Nylon 66), Although polyhexamethylene SEBAKAMIDO (Nylon 610), poly amino UNDEKAMIDO (Nylon 11), poly lauryl amide (Nylon 12) and these copolymers, a mixture, etc. are mentioned, especially nylon 6 is desirable.

[0010] To the fatty series polyamide of Y layer, the performance of a film in the range which is not spoiled Moreover, talc, Lubricant, such as silica, alumina, magnesia, calcium carbonate, ethylene-bis-stearylamide, and calcium stearate, paints and heat stabilizer, an antioxidant, a weathering agent, fire retardant, a plasticizer, and a release agent can also be blended.

[0011] As a typical example of the KISHIRIREN system polyamide which is the composition ingredient of Z layer in this invention Polymetaxylylene adipamide is especially desirable although polymetaxylylene adipamide, polymetaxylylene SEBAKAMIDO, polymetaxylylene SUPERAMIDO, poly PARAKISHIRIREN adipamide and these copolymers, and a mixture are mentioned.

[0012] In this invention, Z layer needs to consist of KISHIRIREN system polyamide 20 - 80 mass %, and 20 to fatty series polyamide 80 mass %. The smell retaining property improvement effect of the film obtained as the content of KISHIRIREN system polyamide is less than 20% is not enough, and if it exceeds 80%, layer indirect arrival power with a fatty series polyamide layer will decline.

[0013] Although the biaxial drawing lamination film of this invention needs to consist of at least three sorts of layers, X layer, Y layer, and Z layer, according to a use and the purpose, you may change layer composition.

[0014] In order to avoid the trouble which originates in the water absorptivity of physical properties, such as intensity, the gas barrier property, etc. of the lamination film obtained, the film fracture at the time of film manufacture, or EVOH as typical layer composition X layer which consists of EVOH is not made into an external surface coat, it is [way] desirable and

the five-layer composition of Y/Z/X/Z/Y is suitable.

[0015] In this invention, as the film production method of a non-extended lamination film After fusing several sorts of resin which constitutes each layer in a separate extrusion machine and laying it on top of multilayer structure within a feeding block, Although the method (mono-manifold type) of pushing out from a dice, the multi-manifold method which piles up and pushes out several sorts of fused resin in multilayer structure in a dice, etc. can be used, since the thickness accuracy of each layer is high, the multi-manifold method is desirable. After co-extruding from a dice, a non-extended lamination film is obtained by carrying out rapid cooling on a cooling roller.

[0016] Although methods, such as a flat type serial biaxial drawing, a flat type simultaneous biaxial drawing, and the tubular method, can be used as the extension method of a non-extended lamination film, film thickness accuracy is good, and since the physical properties of a film cross direction are uniform, a flat type simultaneous biaxial drawing method is the optimal.

[0017] After carrying out wet treatment of the non-extended lamination film by a flat type simultaneous biaxial drawing method in the warm water tub which carried out temperature control, with a clip, grasp the end of a film and [the temperature of 80-200 degrees C] The biaxial drawing lamination film of desired thickness can be obtained by carrying out a simultaneous biaxial drawing with a draw ratio with an every direction [each] of about 2.5 to 4 times, and heat-treating at the temperature of 180-220 degrees C with the relaxation rate of 3 to 8% in the film width direction.

[0018] Although the thickness in particular of the biaxial drawing lamination film of this invention is not limited, when using it as a flexible wrapping material, it is usually considered as a thickness of 10-50 micrometers. If thickness is thin, coexistence of pinhole-proof nature, and a gas barrier property and a smell retaining property will become difficult, and if thickness is thick, transparency and crookedness-proof fatigue nature will get worse.

[0019]

[Example] Next, a work example explains this invention still more concretely. In addition, the materials and the measuring method which were used for evaluation of a work example and a comparative example are as follows.

[0020] (1) Materials Polly epsilon-KAPURAMIDO (nylon 6) : Unitika, Ltd. make A1030BRF poly meta xylene adipamide (MXD6): Mitsubishi Gas Chemical Co., Inc. make MX nylon 6011EVOH: Kuraray Co., Ltd. make Eval EP-F101BZ (rate % of 32mol of ethylene copolymerization)

Talc: Japanese talc company make Super talc SG-2000 [0021] (2) The small bag (method bag of three of 80mm x 80mm of outer sizes) which laminated adhesives/LLDPE (50 micrometers) on the measuring method ** smell retaining property biaxial drawing lamination film, and filled it

up with a dressing and soy sauce using the film was manufactured. This small bag was put into the 100ml reagent bottle, it was kept under 20-degree-C65%RH atmosphere, and the existence of the bad smell leak was checked by sensory analysis for every temporality. The valuation basis was as follows.
x: With no bad smell leak 20 days ten days and 20 days after bad smell leak check **: and after bad smell leak check O: [0022] ** OX-TRAN2/20 made from degree Modern Control of oxygen penetration were used, and 20 degrees C was measured on condition of RH 85%. (Unit: ml/(m2 and day-MPa)/(one-sheet thickness))
[0023] ** Follow Method 2017 of Fed.Test Method Std.101C shown in crookedness-proof pinhole nature MIL-B-131F. a sample (12 inches x 8 inches) -- the number of pinholes 3.5 inches in diameter after grasping cylindrical and giving crookedness 500 times under 5-degree C conditions what is called with a GERUBO tester (made by a physical science industrial company) as the initial grasping interval of 7 inches, and a grasping interval of 1 inch at the time of the maximum crookedness It evaluated.
[0024] ** After exfoliating a lamination film end with a layer exfoliation powerful width of 15mm in an interface, exfoliation strong power was measured on condition of for 300mm/in exfoliation speed by the T Peel method in 20 degrees C and 65%RH atmosphere using the autograph by Shimadzu Corp.
[0025] To work-example 1EVOH, 10 mass % boiled talc comparatively and it added, and with the biaxial extrusion machine set as 210 degrees C, fusion kneading was carried out and it pelletized. Moreover, fusion kneading of what mixed [nylon 6] 70 mass % for 30 mass % and MXD6 was carried out with the biaxial extrusion machine set as 270 degrees C, and the pellet was obtained. Subsequently, nylon 6 is pushed out at 250 degrees C from the 1st extrusion machine using co-extrusion T Di for three sorts of five layers (Y layer), A talc content EVOH pellet is pushed out at the temperature of 215 degrees C from the 2nd extrusion machine (X layer). Nylon 6 and the mixed pellet of MXD6 are pushed out from the 3rd extrusion machine, respectively (Z layer). The film laminated in order of Y/Z/X/Z/Y for the multi-manifold type dice was stuck on the cooling drum which carried out temperature control to the skin temperature of 18 degrees C, rapid cooling was carried out, and the thickness of each layer obtained the non-extended lamination film with a thickness [total] of 150 micrometers by Y/Z/X/Z/Y=45/5/50/5/45micrometer. After leading the obtained non-extended lamination film to the warm water tub which carried out temperature control to 60 degrees C and performing water absorption processing for 90 seconds, the simultaneous biaxial drawing was carried out and the 15-micrometer-thick biaxial drawing lamination film was obtained. In addition, extension conditions are 3.3 times in a lengthwise direction at the temperature of 175 degrees C at 3 times and a transverse direction, and heat treatment conditions are the temperature of 210 degrees C, and 5% of a relaxation rate.

[0026] Except having made additive-free talc to work-example 2EVOH, it pushed out and extended by the same method as a work example 1, and the 15-micrometer-thick biaxial drawing lamination film was obtained.

[0027] Except having changed the nylon 6 of a work-example 3Z layer, and the mixture ratio of MXD6, it pushed out and extended by the same method as a work example 1, and the 15-micrometer-thick biaxial drawing lamination film was obtained.

[0028] Except not supplying nylon 6 and the mixed pellet of MXD6 to the comparative example 1 3rd extrusion machine, but throwing in only nylon 6 instead, it pushed out and extended by the same method as a work example 2, and the 15-micrometer-thick biaxial drawing lamination film was obtained.

[0029] the method as a work example 1 that it is the same except having set only to MXD6 the pellet supplied to the comparative example 2 3rd extrusion machine -- extrusion -- it extended and the 15-micrometer-thick biaxial drawing lamination film was obtained.

[0030] the nylon 6 of a pellet fed into the comparative example 3 3rd extrusion machine, and the mixture ratio of MXD6 -- the method as a work example 1 that it is the same except having changed the rate -- extrusion -- it extended and the 15-micrometer-thick biaxial drawing lamination film was obtained.

[0031]

[Table 1]

		Z層組成比（質量%）ナイロン6/MXD6	X層 タルク添加量（質量%）	耐屈曲 ピンホール性（個数）	酸素透過度（＊1）	層間剥離 強力（N/cm）	保香性	
							ドレッシング	醤油
実施例	1	30／70	10	8	27	2．4	○	○
	2	30／70	0	22	55	2．5	△	△
	3	70／30	10	9	28	2．7	△	○
比較例	1	100／0	0	20	60	2．7	×	×
	2	0／100	10	12	20	0．3	○	○
	3	90／10	10	19	57	2．1	×	△

＊1 単位 ml／（m^2・day・MPa）／（1枚厚み）

未延伸フィルムの厚み構成は全て45／5／50／5／45μm （Y／Z／X／Z／Y）

[0032] As shown in Table 1, the smell retaining property is improved and the film which prepared the intermediate layer who mixed MXD6 with nylon 6 does not almost have the fall of the peel strength between layers, either. Moreover, a smell retaining property improves further by carrying out the amount content of specification of the talc in an EVOH layer like a work example 1, and barrier performance and pinhole-proof nature also improve. On the other hand, since the comparative example 1 did not prepare the intermediate layer containing MXD6 and did not make EVOH contain talc, its smell retaining property was low and the bad smell leak

produced it in [small] ten days. Although a comparative example 2 shows the outstanding smell retaining property, since nylon 6 and the adhesiveness of MXD6 are bad, the peel strength between layers is falling remarkably and it is inadequate for practical use. [of peel strength] A comparative example 3 has low addition of MXD6 in an intermediate layer, although the smell retaining property is improving by addition of talc to the inside of EVOH, and sufficient smell retaining property improvement effect is not acquired.

[0033]

[Effect of the Invention] As mentioned above, according to this invention, it has the intensity which was excellent in the polyamide film, and dimensional stability and the gas barrier property which was excellent in EVOH, and the film with which the smell retaining property has been improved can be obtained by preparing the layer containing KISHIRIREN system polyamide. Moreover, according to this invention, it is making EVOH contain talc of the quantity of the predetermined range, Without spoiling the intensity of a film or raising materials cost, it becomes possible to obtain the film with which a smell retaining property, gas barrier property, and a pinhole-proof have been improved further, and the use range of the gas barrier nature lamination film restricted until now spreads greatly. Therefore, the industrial utility value of the lamination film manufactured by this invention is very high.

[Translation done.]